WHAT IS CLAIMED IS:

1. A photosensitive composition for volume hologram recording comprising an organic-inorganic hybrid polymer and/or its hydrolyzed polycondensate, a photopolymerization reactive compound and a photopolymerization initiator, wherein said organic-inorganic hybrid polymer is obtainable by copolymerizing at least an organometallic compound represented by the following general formula 1 and a monomer having an ethylenically unsaturated bonding:

General formula 1:

$R^1_m M^1 (OR^2)_n$

Wherein M^1 represents a metallic atom, R^1 may be identical or different and represents a group having an ethylenically unsaturated bonding and containing 1-10 carbon atoms, R^2 may be identical or different and is alkyl group containing 1-10 carbon atoms, m+n represents the number of valence of metal M^1, $m \geq 1$ and $n \geq 1$.

2. A photosensitive composition for volume hologram recording according to claim 1, wherein said composition further comprises an organometallic compound represented by the following general formula 2:

General formula 2:

$M^2 R^3_{n'}$

wherein M^2 represents a metallic atom, R^3 may be identical or different and is a halogen, an alkyl group,

alkoxyl group or acyloxy group containing 10 carbon atoms or less respectively or hydroxyl group , all or portion of these groups may be replaced with chelate ligand, and n' represents the number of valence of metal M^2.

3. A photosensitive composition for volume hologram recording according to claim 1, wherein said hydrolyzed polycondensate is a hydrolyzed polycondensate of said organic-inorganic hybrid polymer and/or its hydrolyzed polycondensate and an organometallic compound represented by the following general formula 2:

General formula 2:

$M^2 R^3 n'$

Wherein M^2 represents a metallic atom, R^3 may be identical or different and is a halogen, an alkyl group, alkoxyl group or acyloxy group containing 10 carbon atoms or less respectively or hydroxyl group, all or portion of these groups may be replaced with chelate ligand, and n' represents the number of valence of metal M^2.

4. A photosensitive composition for volume hologram recording according to claim 1, wherein said composition further comprises a sensitizing pigment.

5. A photosensitive composition for volume hologram recording according to claim 1, wherein said photopolymerization reactive compound is a compound having

an ethylenically unsaturated bonding capable of performing addition polymerization and said photopolymerization initiator is a photo-radical polymerization initiator.

6. A photosensitive composition for volume hologram recording according to claim 1, wherein said photopolymerization reactive compound is a compound capable of performing cationic polymerization and said photopolymerization initiator is a photo-cationic polymerization initiator.

7. A photosensitive medium for volume hologram recording, wherein a coating layer of a photosensitive composition for volume hologram recording according to any one of claims 1 to 6 is provided on a substrate.

8. A photosensitive medium for volume hologram recording, wherein a volume hologram recording material layer comprising a hydrolyzed polycondensate of an organic-inorganic hybrid polymer obtainable by copolymerizing at least an organometallic compound represented by the following general formula 1 and a monomer having an ethylenically unsaturated bonding, a photopolymerization reactive compound, and a photopolymerization initiator is provided on a substrate:

General formula 1:

$R^1 mM^1 (CR^2)n$

Wherein M^1 represents a metallic atom, R^1 may be identical or different and represents a group having an ethylenically unsaturated bonding and containing 1-10 carbon atoms, R^2 may be identical or different and is alkyl group containing 1-10 carbon atoms, m+n represents the number of valence of metal M^1, $m \geq 1$ and $n \geq 1$.

9. A photosensitive medium for volume hologram recording according to claim 8, wherein said hydrolyzed polycondensate contained in said volume hologram recording material layer is a hydrolyzed polycondensate of said organic-inorganic hybrid polymer and/or its hydrolyzed polycondensate and an organometallic compound represented by the following general formula 2:

General formula 2:

$M^2 R^3 n'$

Wherein M^2 represents a metallic atom, R^3 may be identical or different and is a halogen, an alkyl group, an alkoxyl group or an acyloxy group containing 10 carbon atoms or less respectively or a hydroxyl group, all or portion of these groups may be replaced with chelate ligand, and n' represents the number of valence of metal M^2.

10. A photosensitive medium for volume hologram recording according to claim 8, wherein said volume hologram recording material layer further comprises a sensitizing pigment.

11. A photosensitive medium for volume hologram recording according to claim 8, wherein said photopolymerization reactive compound is a compound having an ethylenically unsaturated bonding capable of performing addition polymerization and said photopolymerization initiator is a photo-radical polymerization initiator.

12. A photosensitive medium for volume hologram recording according to claim 8, wherein said photopolymerization reactive compound is a compound capable of performing cationic polymerization and said photopolymerization initiator is a photo-cationic polymerization initiator.

13. A photosensitive composition for volume hologram recording comprising an organic-inorganic hybrid polymer which is obtainable by copolymerizing at least an organic silicon compound represented by the following general formula 3 and a monomer having an ethylenically unsaturated bonding and/or a hydrolyzed polycondensate of said organic-inorganic hybrid polymer, an organometallic particle which has a photopolymerization reactive group and is capable of exhibiting a refractive index different from that of hydrolyzed polycondensate of said organic-inorganic hybrid polymer when said organometallic particle is in a form of a polymer and a photopolymerization initiator:

General formula 3:

$R^4m\ Si\ (OR^5)n$

Wherein R^4 may be identical or different and is a group having an ethylenically unsaturated bonding and containing 1-10 carbon atoms, R^5 may be identical or different and is an alkyl group containing 1-10 carbon atoms, $m+n=4$, $m\geq1$ and $n\geq1$.

14. A photosensitive composition for volume hologram recording according to claim 13, wherein said composition further comprises an organic silicon compound represented by the following general formula 4:

General formula 4:

$R^6m\ Si\ (OR^7)n$

wherein R^6 may be identical or different and is an alkyl group containing 1-10 carbon atoms, or a hydrocarbon group containing 1-10 carbon atoms and having an alkoxyl, a vinyl, an acryloyl, a methacryloyl, an epoxy, an amide, a sulfonyl, a hydroxyl or a carboxyl, R^7 may be identical or different is an alkyl group containing 1-10 carbon atoms, $m+n=4$, $m\geq1$, and $n\geq1$.

15. A photosensitive composition for volume hologram recording according to claim 13, wherein said hydrolyzed polycondensate is a hydrolyzed polycondensate of said organic-inorganic hybrid polymer and/or its hydrolyzed polycondensate and an organometallic compound represented by the following general formula 4:

General formula 4:

$R^6m\ Si\ (OR^7)n$

Wherein R^6 may be identical or different and is an alkyl group containing 1-10 carbon atoms, or a hydrocarbon group containing 1-10 carbon atoms and having an alkoxyl, a vinyl, an acryloyl, a methacryloyl, an epoxy, an amide, a sulfonyl, a hydroxyl or a carboxyl, R^7 may be identical or different and is an alkyl group containing 1-10 carbon atoms, $m+n=4$, $m\geq 1$, and $n\geq 1$.

16. A photosensitive composition for volume hologram recording according to claim 13, wherein said composition further comprises a sensitizing pigment.

17. A photosensitive composition for volume hologram recording according to claim 13, wherein said organometallic particle is a compound having an ethylenically unsaturated bonding capable of performing addition polymerization as a photopolymerization reactive group and said photopolymerization initiator is a photo-radical polymerization initiator.

18. A photosensitive composition for volume hologram recording according to claim 13, wherein said organometallic particle is a compound having a cationic polymerization group as a photopolymerization reactive group and said photopolymerization initiator is a photo-

cationic polymerization initiator.

19. A photosensitive medium for volume hologram recording, wherein a coating layer of a photosensitive composition for volume hologram recording according to any one of claims 13 to 18 is provided on a substrate.

20. A photosensitive medium for volume hologram recording, wherein a volume hologram recording material layer comprising a hydrolyzed polycondensate of an organic-inorganic hybrid polymer obtainable by copolymerizing at least an organic silicon compound represented by the following general formula 3 and a monomer having an ethylenically unsaturated bonding, and an organometallic particle which has a photopolymerization reactive group and is capable of exhibiting a refractive index different from that of hydrolyzed polycondensate of said organic-inorganic hybrid polymer when said organometallic particle is in a form of a polymer and a photopolymerization initiator is provided on a substrate:

General formula 3:

$R^4m\ Si\ (OR^5)n$

Wherein R^4 may be identical or different and is a group having an ethylenically unsaturated bonding and containing 1-10 carbon atoms, R^5 may be identical or different and is an alkyl group containing 1-10 carbon atoms, $m+n=4$, $m\geq 1$ and $n\geq 1$.

21. A photosensitive medium for volume hologram recording according to claim 20, wherein said hydrolyzed polycondensate contained in said volume hologram recording material layer is a hydrolyzed polycondensate of said organic-inorganic hybrid polymer and/or its hydrolyzed polycondensate and an organic silicon compound represented by the following general formula 4:

General formula 4:

$R^6_m Si (OR^7)_n$

Wherein R^6 may be identical or different and is an alkyl group containing 1-10 carbon atoms, or a hydrocarbon group containing 1-10 carbon atoms and having an alkoxyl, a vinyl, an acryloyl, a methacryloyl, an epoxy, an amide, a sulfonyl, a hydroxyl or a carboxyl, R^7 may be identical or different and is an alkyl group containing 1-10 carbon atoms, $m+n=4$, $m\geq 1$, and $n\geq 1$.

22. A photosensitive medium for volume hologram recording according to claim 20, wherein said volume hologram recording material layer further comprises a sensitizing pigment.

23. A photosensitive medium for volume hologram recording according to claim 20, wherein said organometallic particle is a compound having an ethylenically unsaturated bonding capable of performing addition polymerization as a

photopolymerization reactive group and said photopolymerization initiator is a photo-radical polymerization initiator.

24. A photosensitive medium for volume hologram recording according to claim 20, wherein said organometallic particle is a compound having a cationic polymerization group as a photopolymerization reactive group and said photopolymerization initiator is a photo-cationic polymerization initiator.

25. A photosensitive composition for volume hologram recording comprising a binder resin bonded to a metal, a photopolymerization reactive compound, and a photopolymerization initiator.

26. A photosensitive composition for volume hologram recording according to claim 25, wherein said composition further comprises a sensitizing pigment.

27. A photosensitive composition for volume hologram recording according to claim 25, wherein said binder resin comprises an oligomer whose average molecular weight is in a range of 1,000-10,000.

28. A photosensitive composition for volume hologram recording according to claim 27, wherein said oligomer is a

multifunctional epoxy compound having a hydroxyl group or carboxyl group, and said composition further comprises an acid generation catalyst for epoxy hardening.

29. A photosensitive composition for volume hologram recording comprising a binder resin containing a hydroxyl group and/or carboxyl group, a metal chelate compound, a photopolymerization reactive compound, and a photopolymerization initiator.

30. A photosensitive composition for volume hologram recording according to claim 29, wherein said composition further comprises a sensitizing pigment.

31. A photosensitive composition for volume hologram recording according to claim 29, wherein said binder resin comprises an oligomer whose average molecular weight is in a range of 1,000-10,000.

32. A photosensitive composition for volume hologram recording according to claim 31, wherein said oligomer is a multifunctional epoxy compound having a hydroxyl group or carboxyl group, and said composition further comprises an acid generation catalyst for epoxy hardening.

33. A photosensitive medium for volume hologram recording, wherein a coating layer of a photosensitive composition for

volume hologram recording according to any one of claims 25 to 32 is provided on a substrate.